

REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.111, and in light of the remarks which follow, are respectfully requested.

The specification has been amended to correct a typographical error in Table 7.

Claims 1 through 38 have been canceled without prejudice or disclaimer. New claims 39 through 50 have been added. Claims 39-50 are supported by the original disclosure, for example, as summarized below:

| <u>New claims</u> | <u>Support in the disclosure</u> |
|-------------------|--|
| Claim 39 | original claims 23, 35 and 38, and paragraph [0199]; |
| Claim 40 | original claim 24; |
| Claim 41 | original claim 26; |
| Claim 42 | paragraph [0178] of the specification; |
| Claim 43 | paragraph [0179] of the specification; |
| Claim 44 | original claim 25; |
| Claim 45 | paragraph [0196] and Table 1 of the specification; |
| Claim 46 | paragraph [0196] of the specification; |
| Claims 47-48 | original claims 27 and 28, respectively; |
| Claim 49 | paragraph [0208]; and |
| Claim 50 | original claim 32. |

Claims 39-50 are pending in the application.

I. Priority Claim

The Examiner does not acknowledge Applicants' priority claim or confirm receipt of a certified copy of the priority document.

Applicants submit that a certified copy of Applicants' priority document, i.e., French Patent Application No. 0110871, was previously submitted on February 13, 2004.

Accordingly, the Examiner is respectfully requested to acknowledge Applicants' priority claim and confirm receipt of the certified copy of the priority document in the next PTO communication.

II. Drawings

The Examiner does not indicate that the drawings filed on February 13, 2004 have been accepted.

The Examiner is respectfully requested to acknowledge such acceptance in the next PTO communication.

III. Response to Rejections under 35 U.S.C. § 112, First and Second Paragraphs, and 35 U.S.C. §§ 102(e)/103(a)

Claims 1-16 are rejected under 35 U.S.C. § 112, first and second paragraphs, for the reasons set forth in paragraphs 3 and 4 of the Office Action. In addition, claims 1-28 and 30-38 are rejected under 35 U.S.C. § 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 6,191,205 to Micouin et al. or U.S. Patent Application No. 2005/0282951 to Esch et al. or WO 01/07364 to Dokter et al. for the reasons set forth at paragraphs 9-12 of the Office Action. Further, claim 29 is rejected under 35

U.S.C. § 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Micouin et al., for the reasons set forth at paragraph 14 of the Office Action.

Applicants submit that these rejections are moot in light of the cancellation of claims 1-38.

IV. New Claims 39 - 50

Newly added claims 39-50 are directed to a tire comprising a rubber composition which comprises at least a diene elastomer, a reinforcing inorganic filler, and a coupling agent providing the bond between the reinforcing filler and the elastomer. The inorganic filler comprises at least one silica having specific characteristics of BET, CTAB, d_w , L/FI and N_{SiOH/nm^2} , which parameters are well known by those skilled in the art to characterize and classify silicas, notably highly dispersible silicas (HDS) used for reinforcing tires.

In particular, as a general rule, it is well known by those skilled in the art that the higher the CTAB surface area, the more the particle size (d_w) is reduced. The present invention, however, does not follow this general rule. Specifically, the present invention combines both a high CTAB specific surface area and a high particle size d_w (feature (d)).

Further, fineness index FI characterizes the size of the silica pores and parameter L characterizes the width of the pore size distribution. Thus, L / FI characterizes the heterogeneousness of the pore size. Porosity measurements are well known by those skilled in the art. The specific silica in the present invention satisfies a relationship between heterogeneousness (porosity) and CTAB specific surface (feature (e)), which is not the usual relationship met by conventional HDS silicas.

Moreover, the hydrophilic property (i.e., water affinity) of a silica may be evaluated in a known manner by the amount of silanols (Si-OH) which are present at the surface of the

silica. As well known, a high hydrophilic surface reduces the affinity of the silica to diene elastomers. In the present invention, the silica has a surface which is less hydrophilic for a given specific surface CTAB (feature (f)).

The silica in the present invention combines the above-mentioned features (d), (e) and (f), and can be prepared by a process comprising a specific reaction of a silicate with an acidifying agent to obtain a silica suspension, separation and drying of the obtained suspension. In particular, the first step of precipitation is conducted at a pH value of between 2 and 5, which is an acidic pH.

The specific silica of the present invention makes it possible to reach a compromise of properties which is superior to that provided by the conventional silica which is used today in the tread of "Green Tires" (see, in particular, paragraphs [0007], [0008] and [0252]), and more particularly, superior to the properties obtained with the well known silica "Zeosil 1165" (from Rhodia Company). Zeosil 1165 constituted, without any doubt, the reference of the skilled person in the tire industry, at the time the present invention was made.

Compared to Zeosil 1165, the silica in the present invention provides a significant improvement in terms of wear resistance (9 to 14% in the Examples). See, e.g., paragraphs [0278] and [0290]; Tables 3 and 6 of the present specification.

In addition, the silica in the present invention offers a reduced (i.e., improved) rolling resistance (see paragraphs [0276] and [0288]), as well as exceptionally high processability (see paragraphs [0010] and [0014]).

Furthermore, none of the cited documents, taken alone or in combination, discloses or suggests the use in a tire of the specific silica of the present invention combining six different technical features, and more particularly, features (d), (e) and (f).

Specifically, Micouin et al., which is equivalent to EP 881 252 cited in the International Search Report, discloses a silica having a relatively high BET surface and specific porosity properties (see abstract), and prepared by a process which is radically different from that used in the present application. In particular, in Micouin et al., the first precipitation step is performed at a pH value between 7 and 8.5, which is a basic pH. In contrast, as noted above, the process for preparing the silica used in the tire of the present invention requires an acidic pH of between 2 and 5.

It should be noted that this silica of Micouin et al. does not improve the wear resistance, as compared to the reference silica Zeosil 1165. In this regard, the results contained in Table I of Micouin et al. show that Test 1 (invention thereof) and Test 2 (prior art) provided the same wear resistance (DVM) value of 100 (cols. 12, lines 37-38; col. 13, line 11).

Moreover, Applicants submit herewith additional experimental data in the form of a Declaration under 37 C.F.R. § 1.132. The Declaration confirms that the silica described in Micouin et al. does not meet the requirements for the silica in the present invention. In addition, the Declaration demonstrates the unexpectedly superior results of the present invention, thereby further supporting the patentability of the present invention.

Specifically, in the Declaration, Tire P-8 was prepared in the same manner as described in the present specification, except that the silica described in Micouin et al. was used. Wear resistance of Tire P-8 was then evaluated in the same manner as described in the present specification. The properties of the silica and test result for Tire P-8 are summarized in the table below, along with those for Tires P-1, P-2 and P-4 described in the present specification:

| | | | | |
|---|------------------------------|----------------------|----------------------|---|
| TIRE: | P-1 | P-2 | P-4 | P-8 |
| Rubber composition: | C-1 | C-2 | C-4 | C-8 |
| Silica : | A (Reference) Zeosil 1165 | B (Invention) | C (Invention) | Silica according to US 6,191,205 |
| BET surface (m ² /g) | 160 | 240 | 222 | 215 |
| CTAB surface (m ² /g) | 155 | 221 | 200 | 194 |
| d _w (nm) | 59 | 79 | 68 | 42 |
| L / FI | 0.39 | 0.62 | 0.70 | 0.21 |
| N _{SiOH/nm²} | 8.10 | 3.90 | 4.50 | 6.1 |
| d) : d _w ≥ 16,500/CTAB – 30 ? | NO (59 < 76) | YES (79 ≥ 45) | YES (68 ≥ 53) | NO (42 < 55) |
| e) : L / FI ≥ -0.0025 CTAB + 0.85 ? | NO (0.39 < 0.46) | YES (0.62 ≥ 0.30) | YES (0.70 ≥ 0.35) | NO (0.21 < 0.37) |
| f) : N _{SiOH/nm²} ≤ -0.027 CTAB + 10.5 ? | NO (10.1 > 8.1) | YES (3.9 ≤ 4.5) | YES (4.5 ≤ 5.1) | NO (6.1 > 5.3) |
| Wear Resistance | 100 | 114 | 110 | 100 |

It should be noted that neither the Reference silica (Zeosil 1165) nor the silica according to Micouin et al. meets the three criteria (d), (e) and (f) of the present invention.

The results in the above table also show that the silica according to Micouin et al. provided the same wear resistance value (100) as Tire P-1 containing Zeosil 1165, whereas Tires P-2 and P-4 according to the present invention provided wear resistance value of 114 and 110, respectively. These results confirm that the silica according to Micouin et al. does not bring any improvement in terms of wear resistance, contrary to Tires P-2 and P-4 according to the present invention. That is, the present invention provides unexpected superior results.

Returning to Esch et al., Esch et al. (see abstract and paragraph [0016]) discloses a rubber composition for tires which contains as filler a precipitated silica obtained by a specific process comprising an essential step of reacting an alkali silicate with mineral acids

at 60-95°C while maintaining a pH value of 7.5 to 10.5. That is, similar to Micouin et al., this step of Esch et al. is carried out at a basic pH.

WO '364 discloses another process in which the mineral (sulfuric) acid is added so that a basic pH value of 8-10 is maintained.

That is, the silicas of Esch et al. and WO '364 belong to the same category as that of Micouin et al. In other words, the processes according to Esch et al. and WO '364 cannot lead to the specific silica used in the tire of the present invention.

In view of the foregoing, Applicants respectfully submit that the present claims are novel and patentable over Micouin et al., Esch et al. and WO '364, alone or in combination.

V. Conclusion


From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (202) 452-7932 at his earliest convenience.

Respectfully submitted,

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